



**KRP Work  
Instruction**

**Perimeter Wall Stabilization (PWS)  
Surveying**

**KRP-WI-ENG-001  
Rev. 0003  
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Prepared by: Jason Brown

Approved by:

*Randy Denton*

Randy Denton, Process Owner

*12-19-2012*

Date

Approved by:

*Joe Benedict*

Joe Benedict, Lead Department Head

*12/20/12*

Date

Approved by:

*Joe Benedict*

Joe Benedict, Quality Manager

*12/20/12*

Date

Approved by:

*Kathryn Nash*

Kathryn Nash, Site General Manager

*12/20/12*

Date

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### Revision Log

<b>Revision or Change Number</b>	<b>Effective Date</b>	<b>Affected Page Numbers</b>	<b>Description of Revision/Change</b>
0	02/03/2012		Work Instruction issued in response to KRP-00-DF-112211 Misalignment of Shear Wall 88, PER #467902, November 11, 2011.
1	03/21/2012		Added requirement of all PWS surveying activity to be second-party verified. General revision to incorporate additional scope of jet grouting and coring. Added responsibility summary (Section 3.1.8), tolerance chart (Section 3.2.3.1), and work flow process (Section 3.2.6).
2	04/05/2012		Clarified as-built survey information. Clarified PWS wall tolerance of +/- 0.1 ft for vertical and horizontal.
3	01/09/2013		Complete rewrite, change work instruction identification from KRP-WI-CON-015 to KRP-WI-ENG-001.

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## **1.0 PURPOSE**

This Work Instruction (WI) documents the steps necessary to request, stake, and verify the locations used for construction or repair of the Perimeter Wall Stabilization (PWS) construction at the Kingston Ash Recovery Project (KRP) site.

## **2.0 SCOPE**

This process applies of all parties involved with surveying for construction and repairs to the PWS.

### **2.1 Cadence Review**

This process is reviewed twice a year with the review documented in the Revision Log. Requests for revisions are sent to the TVA KRP Quality Assurance (QA) Department and will be forwarded to the Process Owner.

## **3.0 PROCESS**

See Attachment 1 for the Surveying Work Flow Process.

### **3.1 Roles and Responsibilities**

#### **A. Process Owner**

1. Ensures all parties involved with survey effort for the PWS adhere to this WI.
2. Revises this WI when necessary.
3. Works with Geo-Con, TVA surveyors, and the Engineer-of-Record (EOR) to clarify, improve, or develop surveying needs and expectations.
4. Coordinates staffing needs due to PWS needs and other ongoing site activities.
5. Does **not** administratively manage surveying personnel, but does provide functional direction.

#### **B. Stantec (EOR)**

1. Responsible for the design engineering review and quality control (QC) of the PWS associated with the Failed Dredge Cell.
2. Responsible for the review of Geo-Con shop drawings for construction and repair of the PWS.
3. Provides coring locations for the surveyors.

#### **C. Surveyor(s)**

1. Provides Geo-Con with staked survey locations for construction or repair of the PWS.

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### 3.1 Roles and Responsibilities (continued)

2. Obtains 2nd party verification of staked survey locations.

#### **NOTE**

**EOR specifications for surveying are listed in the Technical Specifications and Quality Control Plan issued for construction for each segment.**

#### D. Contract Technical Steward (CTS) (Formerly Technical Contract Manager)

1. Ensures timely transmittals of shop drawings.
2. Advises and communicates with Geo-Con on behalf of TVA.

#### E. Geo-Con QC Personnel

1. Produces shop drawings for constructing and repairing the PWS.
2. Requests surveyors stake locations for constructing and repairing PWS.
3. Constructs and repairs the PWS using surveyor-provided staked locations.

#### F. Jacobs' CAD Engineer and/or Designee

1. Provides surveyors with coordinates used to stake construction and repair locations.
2. Provides verification that surveyor-provided staked locations are accurate for PWS construction or repair.

#### G. TVA Construction Wall Manager

1. Manages all PWS construction on behalf of TVA.

### 3.2 Instructions

#### A. PWS construction and repair surveying and 2nd party verification proceeds as follows:

1. Geo-Con QC personnel request TVA surveyors to stake proposed construction survey locations. The request is made via email or verbally. A copy of the email request is sent to Jacobs' CAD Engineer.
2. The subject line of the email is detailed with relevant construction information such as: Segment number, construction type (Shear Wall, Outboard or Inboard Wall, Cold Joint or Jet Grout Mitigation), location ID(s) (Shear Wall numbers and/or Jet Grout numbers).

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### 3.2 Instructions (continued)

#### NOTE

Other parties involved with the PWS construction are copied on the email as necessary. The list of recipients includes, but is not limited to, the requesting Geo-Con Engineer, TVA surveyor(s), CTS, WI Process Owner, TVA PWS Construction Manager, KRP Document Control, and QA representative(s).

3. The CAD Engineer provides the surveyors with the coordinates (Northing/Easting) of the locations to be staked. The coordinates are derived from the shop drawings issued for construction.
4. The file format for the information shared between the surveyors and the CAD Engineer is a comma separated value (.csv). This format can be used by the surveyors' instruments and CAD Engineer's software.
5. Surveyors download the provided .csv file into their instrument. The .csv file provides coordinates for the surveyors to stake.
6. Surveyors mobilize to the construction location(s) and coordinate with the Geo-Con QC personnel to stake production locations using the coordinates supplied to them by the CAD Engineer.
7. Once surveyors are onsite to stake the requested locations, additional locations may be requested by Geo-Con QC personnel verbally.
8. Coordinate values of all staked locations are downloaded into the survey instrument by the surveyors as a construction point.
9. Geo-Con provides the surveyor(s) a confirmation list with all (including verbal requests) locations requested for staking each day. This list is used as a checklist for the surveyor(s) to verify that the locations requested were staked and that coordinate values have been collected for each location and transmitted to the CAD Engineer for a 2nd party verification. A checklist is not generated by the Geo-Con jet grout QC person due to the large number of requests usually generated for a day's repairs. An email is generated in lieu of a checklist.

#### WARNING

Geo-Con may not begin excavations or repairs until the survey-staked location has been 2nd party verified unless otherwise directed by the CTS.

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### 3.2 Instructions (continued)

10. The coordinate values from a survey effort (repairs and/or construction) are downloaded as an electronic file from the survey instrument. The file(s) is forwarded in .csv format to the CAD Engineer via email.
11. The subject line of the email from the surveyor(s) to the CAD Engineer is detailed with relevant construction information such as: Segment number, construction location (Shear Wall, Outboard or Inboard Wall, old Joint or Jet Grout Mitigation), Location ID(s) (Shear Wall numbers and/or Jet Grout numbers.)
12. The surveyor .csv file(s) is imported into the CAD software program by the CAD Engineer. The staked construction location(s) are verified that each is within the required tolerance limit: tolerance requirements for PWS walls, core holes, and jet grouting is  $\pm 0.1$  ft. In addition to the coordinate locations, the corresponding name(s) of the construction/repair wall is verified.
13. Surveyors submit all .csv files as soon as possible but no later than the close of business.
14. Second party verification occurs within 12 hours. The CAD Engineer or CTS will designate a backup verified in his absence.
15. The CAD Engineer replies to each surveyor verification email whether or not the staked location coordinates are appropriate for construction. The list of recipients for this email will include the surveyor(s), the Process Owner, CTS, Stantec QC Manager, Geo-Con Engineer, QA, Document Control, and others as needed.
16. In the event that the staked locations do not meet QC tolerance requirements, or are not to design specifications, the CTS (primary) and/or TVA Construction Wall Manager (secondary) will be notified. The CTS and/or TVA Construction Wall Manager issue a STOP WORK notification to the appropriate Geo-Con crew. The TVA Construction Wall Manager and CTS coordinate corrective actions in order to proceed with construction/repairs.

### 3.3 Responsibility Summary

Activity	Wall	Jet Grouting	Coring
Identification of points	Geo-Con	Geo-Con	Stantec
Develop electronic files (.csv format)	Jacobs	Jacobs / Geo-Con	Jacobs
Layout and electronic transfer of points	Surveyors	Surveyors	Surveyors
Second party verification	Jacobs	Jacobs	Jacobs
Red lines	Geo-Con	Geo-Con	Geo-Con
As-builts	Stantec	Stantec	Stantec

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#### 4.0 RECORDS

- A. The KRP site is under a "Litigation Hold." All documents (drawings, sketches, documents, emails, notes, and any other written documentation) are to be preserved and retained by order of TVA's Office of General Counsel (OGC). This includes documents classified as "non records" by TVA's Records Management System. All record documents will be placed in the TVA Vault.
- B. KRP Document Control stores all email correspondence regarding survey locations.

#### 5.0 DEFINITIONS

**Cold Joint** - A Cold Joint is a PWS construction joint that requires reinforcement, strengthening, or other mitigation. Cold joints are classified by Stantec.

**Jet Grout Mitigation** - Repair method of the PWS (as identified by Stantec) involving pressurized grout.

**Offset** - A distance measured from the baseline survey line established for the PWS.

**Outboard/Inboard Wall** - The soil-cement perimeter wall poured parallel with the survey station.

**Perimeter Wall Stabilization (PWS)** - Perimeter wall being constructed around the Dredge Cell and Ash Pond. The wall, designed to stabilize and protect the area from movement due to an earthquake, will be approximately 11,500 ft. long and follow the perimeter of the closed Dredge Cell.

**Segment** - The PWS is one containment structure divided into eight sections. Each section has been designated as a numbered segment.

**Shear Wall** - A PWS cement-bentonite wall that is perpendicular to the survey station.

**Shop Drawing** - A drawing produced by Geo-Con used to construct or repair the PWS. Shop drawings are prepared by Geo-Con, reviewed for use by Stantec, and transmitted to the CTS for use.

**Station** - Measured increments of a line at 100 ft. increments.

**Test Parcel** - A length of completed PWS from which specimens of wall construction material (cement-bentonite grout) are obtained for testing compliance with the strength requirements.

#### 6.0 REFERENCES

None



Attachment 1  
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Work Flow Process for Surveying Perimeter Wall Stabilization Construction and Repairs

